

REMARKS

I. Introduction

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1, 2, 4 and 6 Under 35 U.S.C. § 103

Claims 1, 2, 4 and 6 are rejected under 35 U.S.C. § 103 as being unpatentable over JP 11-79702 to Nagano in view of USP No. 5,075,268 to Kurashige. Applicants respectfully traverse this rejection for at least the following reasons.

Claim 1 recites in-part a fuel reforming apparatus comprising a reforming unit including a reforming catalyst for reforming a hydrocarbon containing sulfur compounds to generate a hydrogen gas.

In accordance with one embodiment of the present invention, the control unit controls the supply of hydrocarbon to the reforming catalyst in the reforming unit and the supply of the inert gas or water vapor. The hydrocarbon includes sulfur compounds which poisons the reforming catalyst. The absorption of the sulfur compounds on the catalyst leads to the catalyst becoming inactive. During the reforming reaction, the catalyst is heated. When the catalyst reaches a predetermined temperature, the control unit stops the flow of hydrocarbon and allows an inert gas or water vapor to be supplied to the catalyst in the reforming unit to recover the activity of the catalyst. The activity of the catalyst is recovered by heating the catalyst in an inert gas or water vapor. The foregoing method and apparatus allows the activity of the reforming catalyst to be recovered without the need for replacing the poisoned reforming catalyst.

Combination Of Prior Art Does Not Disclose All Claim Elements

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the ***claimed invention*** where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *Ecolchem Inc. v. Southern California Edison Co.*, 227 F.3d 1361, 56 U.S.P.Q.2d (BNA) 1065 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 999, 50 U.S.P.Q.2d (BNA) 1614, 1617 (Fed. Cir. 1999); *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992). See also **M.P.E.P § 2143.01**.

Turning to the cited prior art, the Examiner asserts that Nagano discloses, at paragraph [0037-0039] and [0051-0055], a reforming unit 1 including a reforming catalyst 11, a heater for heating the outer wall and carrying heat supply to the reforming catalyst 11, and a control unit 3 for controlling the supply of raw material 20 on the basis of the temperature of the reforming catalyst 11.

However, contrary to the conclusions set forth in the pending rejection, Nagano and Kurashige both relate to a method for reforming **methanol** to produce a hydrogen containing gas in which air or low-concentration oxygen is supplied to the reforming catalyst so as to recover the activity of the reforming catalyst containing **copper**. Importantly, both Nagano and Kurashige are silent with regard to the deterioration of the activity of reforming catalyst due to **sulfur** components.

Thus, at a minimum, Nagano and Kurashige, take alone or in combination, do not disclose a reforming unit including a reforming catalyst for reforming hydrocarbon containing sulfur compounds to generate a hydrogen gas, as recited by claim 1.

Although both references disclose the inert gas such as nitrogen, Nagano uses the inert gas to suppress heat generation due to air oxidation of reformed gas or methanol remained in the catalyst, and Kurashige uses the inert gas as an additional gas to the gas for recovering the catalyst activity. Accordingly, the inert gas of the above references does not directly contribute to the recovery of the catalyst activity.

As each and every limitation must be either disclosed or suggested by the cited prior art in order to establish a *prima facie* case of obviousness (see, **M.P.E.P. § 2143.03**), and Nagano and Kurashige, singly or jointly, fail to do so, it is respectfully submitted that claim 1 is patentable over the prior art.

There Is No Motivation To Make The Proposed Combination Of Prior Art

In order to establish the requisite motivation, the Examiner must point to a **source** in the applied prior art for **each** claim limitation and a **source** in the applied prior art for the requisite **motivational** element. *Smiths Industries Medical System v. Vital Signs Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999). More to the point, the Examiner is required to make a “thorough and searching” factual inquiry and, based upon that factual inquiry, explain **why** one having ordinary skill in the art would be realistically impelled to modify particular prior art, in this case the methanol reforming approach of Nagano, to arrive at the claimed invention. *In re Lee*, 237 F.3d 1338, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002). Such a factual inquiry requires clear and particular factual findings as to a specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify the methanol reforming approach of Nagano to arrive at the claimed invention. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361,

56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). Merely identifying wherein features of a claimed invention are perceived to reside in disparate references does not establish the requisite motivation. *In re Kotzab, supra*; *Grain Processing Corp. v. American-Maize Products Co.*, 840 F.2d 902, 5 USPQ2d 1788 (Fed. Cir. 1988). Rather, a **specific reason** must be offered based upon **facts** to support the asserted motivation--not generalizations. *Ecolochem Inc. v. Southern California Edison, Co. supra*; *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998).

In applying the above legal tenets to the exigencies of this case, Applicants submit that the requisite motivation element has **not** been established. Specifically, the Examiner has not actually explained **why** based on **facts**, one having ordinary skill in the art would somehow have proceeded **against** the specific teachings of Nagano by heating the reforming unit while the inert gas or water vapor is supplied to the reforming catalyst.

In particular, Nagano is drawn to “a methanol-reforming approach for manufacturing a reformed gas which performs the reforming reaction actuation of making a methanol and water reacting under a reforming catalyst (see, [0002]).” In this regard, Applicants note that Nagano specifically discloses utilizing an inert gas to suppress the heat generation due to the air oxidation of the reformed gas or the methanol remained in the catalyst.

On the other hand, Kurashige is directed to a method for the regeneration of a methanol-reforming catalyst reduced in activity due to its use in a reaction in which methanol is modified. In this regard, Applicants note that Kurashige specifically discloses exposing one of the copper-containing catalysts reduced in activity to an atmosphere having no more than 5 mole % of oxygen, such as an inert gas.

Thus, the Examiner's assertion that the claim recitation "a reforming unit including a reforming catalyst for reforming hydrocarbon containing sulfur compounds to generate a hydrogen gas" of claim 1 is satisfied by Nagano and Kurashige is not supported by the disclosure of Nagano and Kurashige, because neither reference discloses or suggests that the inert gas contributes to the recovery of the catalyst activity.

Also, the Examiner's conclusion of obviousness is without any evidentiary foundation because Nagano is drawn to reforming methanol, while Kurashige is directed to regenerating copper. It is respectfully submitted that one of ordinary skill in the art would NOT have been realistically motivated to modify the methanol reforming approach of Nagano with the use of a methanol reforming catalyst as disclosed by Kurashige in the manner alleged by the Examiner.

Therefore, for at least these reasons, it is respectfully submitted that claim 1 is patentable over the cited prior art.

III. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

For all of the foregoing reasons, it is submitted that claims 2-6 are patentable over the cited prior art. Accordingly, it is respectfully submitted that the rejections of claims 1-6 under 35 U.S.C. § 103 have been overcome.

IV. Conclusion

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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